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East Europe Report

SCIENTIFIC AFFAIRS

No. 680

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POLAND

ROMANIA

COOPERATION IN DISSEMINATION OF SCIENTIFIC-TECHNICAL INFORMATION

Budapest SZAMITASTECHNIKA in Hungarian Jun 80 p 1

[Text] Boris Andreyevich Ozhogen, colleague and head of a bilateral working group of the International Scientific Technical Information Center [NTMIK] visited Budapest under the terms of a bilateral agreement between NTMIK and SZAMOK [Szamitastechnikai Oktato Kozpont - Computer Technology Training Center]. The purpose of the agreement concluded in 1979 is the continuing training of information systems specialists in the field of scientific-technical affairs and exchange of scientific technical experience between NTMIK and SZAMOK. Under the agreement, NTMIK makes records of its activity available to SZAMOK. It passes on its experiences in the development and use of the software of its information systems and information services based on the MSZISZ NIR [expansion unknown data base. Concurrently, SZAMOK undertakes to disseminate Soviet achievements in Hungary, organizes annual seminars at which briefings on NTMIK activities are presented and arranges international seminars for CEMA countries of cooperation in the field of scientific-technical orientation.

During his stay in Hungary, B. A. Ozhogen held discussions with the leaders of SZAMOK concerning the practical realization and broadening of cooperation. He familiarized himself with the organizational structure and activity of SZAMOK, the ISIS system, and he studied the BABILON on-line information retrieval system for the purpose of possibly adopting it.

A special course on "Computerized Document Storage and Retrieval" which was presented during his visit provided Ozhogen with the opportunity of learning more about NTMIK activities. He took part in the consultations following the lectures.

The Moscow headquarters of NTMIK is an autonomous institution of CEMA which employs 250 persons and operates on an annual budget of 2.5 million rubles. Its present processing work is done on an ES 1040 computer using an AIDOS program package for the most part. At this time its data base consists of approximately 350,000 bibliographic and several hundred thousand special documents such as scientific research papers, dissertations and program packages. Its services appear in the form of SDI broken down into 250

and 12 reference periodicals. The latter are put out in photocopies with the aid of a DIGISET SOTI machine.

Development of program packages received from the member countries--sometimes in differing formats--is one of the major functions of NTMIK. It makes possible the integration of information and the use of data bases built up in different ways. The SZKIF is one such program which is exceptionally efficient in analyzing various data bases, and the SZKOF another which performs file conversions. Information is handled by ASZOD (designed chiefly for small machines), MILITITEKSZ (for serial search) and DIALOG (for the dialogue mode of operation). The SZPNT makes output suitable for photocopying.

CSO: 2502

GDR, USSR COOPERATE IN MICROSURGERY

Frankfurt/Oder NEUER TAG in German 24 Jun 80 p 6

[Article by Peter Liebers: "Operation Under the Microscope: Jena Microsurgeons Cooperate With Soviet Partners; Transplantation of Various Tissues Possible"]

[Text] The monitor shows a section of an operation area. With scalpel and forceps blood vessels and nerves are prepared, ligated, separated. At first glance it looks like the type of work that is carried out daily in hundreds of operating rooms. A second look tells us something different. The instruments are as fine as a hair, and without a microscope there is nothing to see. The "patient " turns out to be a white rat under heavy sedation, from which a tiny piece of skin is being removed from the groin. There is a tiny peduncle on it, the vessels and nerves necessary for its support, which are then again connected to each other. We are experiencing a demonstration of a model experiment in the practice of microsurgical techniques, which was developed in the Hospital for Plastic Surgery of the Friedrich Schiller University, Jena. A small collective around the award-winning physician and director of the hospital, Prof Dr Harry Heiner, are doing pioneer work for the socialist countries in this new area of surgery, which only developed in the 1960's, principally in Australia, Japan, and Canada, and which provides medicine with completely new opportunities. "With the aid of microsurgery," according to Professor Heiner, "parts of the body which have been severed in accidents can be attached again or also large soft part defects can be closed again relatively quickly and safely by microsurgical soft-tissue transplants."

Complicated Technique Is Used Together

Therefore a microsurgical team was established last year at the University of Jena, the members of which represent all surgical fields from neurosurgery through gynecology to orthopedics. The team's goal is to make this new technique quickly available to a wide circle of physicians and to develop possible areas of use, as well as to share the expensive equipment

and instruments. Above all, young people can be spared by this process from being life-long invalids. Illnesses can be treated successfully which had previously always led to amputations of limbs.

"The model animal experiment, developed in Jena, is very well suited for providing training in this complicated technique," stressed Assistant Prof Dr Boleslaw Nagay of the Surgical Hospital of the Medical Academy in Szczecin. He was a participant in the second microsurgical training course in Jena, in which physicians from Poland, Czechoslovakia, Hungary, and the German Democratic Republic participated. Clinicians of the Friedrich Schiller University together with the Carl Zeiss VEB, Jena, installed 16 expensive microsurgical work places. Soviet surgeons are receiving training on the basis of the Jena training program and model experiment--in the meantime even physicians from the country where microsurgery originated are interested in it--while Zeiss scientists are taking advantage of Soviet stimuli for the further development of operation microscopes.

Used Successfully in Jena Practice

In the Jena Hospital, where microsurgery progressed within 2 years from animal experiments to clinical practice, this operation technique has meanwhile been used in more than 10 operations. Currently intensive work is being done on the further development and improvement of microsurgical techniques in Jena and at its Soviet partner hospital in Moscow directed by the health minister, academy member, Prof Dr Boris Petrowski. The goal of this is the microsurgical transplantation of various tissues.

The physicians understand by this tissue parts which are completely separated from the body and transferred to other places. Currently complicated operations in several stages are still required for this. If, for example, skin from the abdomen is to be transferred to an injured area of the arm, the arm with the partially transferred skin must be fixed onto the body for a long time. Only when the skin has grown on the arm and is being nourished by it can it be totally separated from the abdomen. This treatment is not only very trying on the patient; it also considerably limits the possibilities of transplantation. When an increasing number of reports which appear sensational get abroad on a finger or arms, torn off in accidents, which have been sewed back on, then microsurgical techniques have produced important prerequisites for this.

9485
CSO: 2302

BRIEFS

FORMING EQUIPMENT CONTRACT--Seven socialist countries signed recently in Czechoslovakia a contract on mutual deliveries of forming equipment [Tvareci Zarizeni] in the 1981-85 period. They will exchange 13,000 forming machines and installations within the framework of the specialization and cooperation of production. The GDR will export more than half of the agreed upon total volume. [Text] [AU090820 Prague RUDE PRAVO in Czech 7 Jul 80 p 2]

CSO: 2020

CAUSES FOR WEAR OF JET ENGINE BEARINGS EXAMINED

Sofia VOENNA TEKHNIKA in Bulgarian No 5, 1980 pp 9-10

[Article by Eng Maj Dimitur Yordanov, candidate of technical sciences, and Eng Maya Georgieva: "Operational Reasons for Bearing Wear in Aviation Gas Turbine Engines"]

[Text] All rotors of modern aviation engines turn in roller bearings. The bearing assemblies operate under specific, difficult operating conditions. Regardless of the high precision in their manufacture and the observance of all technical requirements regarding installation, in aviation practice emergencies are encountered where these bearings fail. The reasons are related to the operating of the engines during the flight and on the ground. Experience has shown that most often as a result of incompetent operation, the requirements are violated for the warming up and cooling off of the engines, and this directly influences the operation of the bearings. Cases where the failure has occurred due to a lack of lubricant are more infrequent, but involve more severe consequences.

In the failure to observe requirements for the warming up and cooling off of the engines, the most sensitive are the rear bearings located near the turbines and directly in contact with hot parts. Failures of these bearings are more characteristic in engines with a centrifugal compressor of the VK-1A type. Ordinarily the reason is a smaller tip clearance of the bearings.

The starting of the engines at temperatures of -20° C and lower without warming creates conditions for the complete disappearance of tip clearance in the rear bearing. Here, the inner race comparatively quickly is warmed up and expands, while the outer one mounted in a casing of an aluminum alloy is first compressed by the elastic deformations from the low-temperature strains which are more substantial for the housing. Such a bearing does not fail immediately, but only after a certain time, that is, during the flight.

In addition to thermal and elastic deformations, the tip clearance of the bearing is substantially influenced by structural changes in the material of the bearing parts, and this can occur with their heating above tolerable

limits. In practice, instances are encountered where after extended operation under high temperature modes, the engines are shut down abruptly, without observing the obligatory cooling-off stage. From the heat which the disc in cooling off transfers to the rear bearing, its temperature in a static state can exceed 200° C, with the heating of the bearing parts being uneven, and the inner race being heated more. In this instance, in the heat-treated bearing parts, structural changes can occur which after final cooling off of all the parts lead to an irreversible reduction in the tip clearance. This rarely disappears completely.

The mechanism of this process can be explained by various changes in the microstructure of the inner and outer races.

The initial structure of the hardened bearing steel consists of tetragonal martensite and residual austenite. The martensite is a structure which has the greatest volume, and the austenite the minimal. The transformations of these structural components are accompanied by volumetric changes. In the heating of bearing parts up to 200° C, changes occur first in the martensite phase, and at higher temperatures (from 200° C to 300° C), in the residual austenite. Naturally, the volumetric changes of the crystal lattice are also related to the change in the dimensions and clearances in the bearings.

After stopping without cooling off, the heat flow from the turbine in the cooling off of the engine heats the inner race more (up to 250° C - 300° C) and less so the outer one (up to 200° C). At these temperatures, the outer race reduces its dimensions due to the bringing of the tetragonal martensite lattice to a cubic one, while the inner race, on the contrary, increases in size from the conversion of the residual austenite into untempered martensite. After the final cooling off of the parts, the bearing remains with a smaller clearance.

The presence of residual austenite after the tempering of the bearing parts is undesirable but unavoidable. Often in bearing steels after tempering, an increased quantity of austenite is found, and in order to in part avoid the undesirable changes in volume with normal operations, the parts are tempered by cooling to -20° C.

The failure of the rear bearing after a reduction of its clearances ordinarily does not occur immediately. Such engines can even operate the normal life between repairs, and after this in flaw detection their bearings are removed to reduced clearance. According to the statistics of repair enterprises, 39 percent of the bearings are changed due to the discrepancy of the clearance to the technical requirements. A larger portion of the bearings changed for this reason has a reduced or completely eliminated tip clearance.

Sometimes the failure of the bearings occurs in the period between repairs, but ordinarily the reduction of their clearance from incorrect operation is not the main reason for this. There always are more strongly acting failure factors of an installation, design-production and operational nature.

The external features from which the initial stage of the failure of rear bearings can be discovered depend upon the design of the assembly, but particularly typical is the presence of chips in the filter of the oil system and the clogging of the labyrinth packings. A shaking of the engine which can be felt in the controls shows a significant failure of the rotor bearing. In bearing in mind the severe consequences of the final failure of the bearings in flight, particular attention must be paid to increased vibration, noncharacteristic noise and the above-described features by which one can prevent the taking off of an aircraft with a malfunctioning engine.

The failure of the bearings caused by insufficient lubrication during operation leaves the following characteristic external traces on the bearing parts: unilateral wear and melting of the balls or of the entire cage; the layering of the material from the balls on the outer race.

But often from these external indications it is impossible to categorically determine whether or not the failure has been caused by "oil hunger" or by other factors (the fatigue of the material and the breaking of the channels, the crossing of the axes of the two races, and so forth). Only metallographic analysis combined with the measuring of the hardness through the sections of the bearing parts provides a clear answer to the question of the conditions under which the failure occurred, that is, with normal supply of the oil or with "oil hunger."

The microstructure in the core of the balls and rollers which have failed with a normal supply of oil is maintained like the initial one. With "oil hunger" the balls and rollers are heated to high temperatures and the initial structure is not maintained. Across the entire section one observes a untempered structure with pearlite, cementites and carbides, the hardness of which is significantly reduced. In the zones with the greatest friction, the material has a completely cooled-off structure.

The inner race of a bearing which has failed under normal lubricating in the zones of wear can have a large-acicular martensite structure (secondary hardening), and in zones where there has been no wear, the initial structure of unstructured martensite and carbides.

If the failure has occurred from "oil hunger," the zones with secondary tempering are not observed in the inner race, and there is no martensite structures. The race is heated across the entire section and is untempered (perlite, cementite and carbides). In the places with the greatest friction, complete cooling of the material is observed and hardness is reduced. If the bearing is a ball bearing and has an axial load, the reduction of hardness is greater on one side of the race.

The material of the outer races, both with normal lubrication and with "oil hunger," maintains its initial structure of martensite and carbides. In instances of failure from "oil hunger," a cooling off is observed only directly under the layer of the applied material.

The reasons for failures in lubrication can be of a varying nature, both subjective and objective. For every design they are described in the appropriate literature. In operating the engines, particular attention must be paid to oil consumption, prompt replenishing, the eliminating of joint leaks and the monitoring of the operation of the oil system in the flight, and also there must be no chips in the filters or increased vibra.ion and uncharacteristi) noise.

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[illegible]

PRODUCTION, ORGANIZATION OF CHEMOPETROL

Prague DOKUMENTACNI PREHLED in Czech 25 Jun 80 No 26 pp G7-G20

[Text] Chemopetrol was founded on 1 July 1965 by Decision No 37/65 of the Ministry of the Chemical Industry, which led to the establishment of the VHJ (economic production unit) Oil and Coal Processing Works and its general management in Prague bearing the same name. On 1 January 1967 the name of the VHJ and the branch management was changed to Chemopetrol, crude oil processing works. On 1 January 1971 the VHJ was restructured as Chemopetrol, concern organization for the chemical industry and crude oil processing, Prague. On 1 January 1975 Chemopetrol, concern for the chemical industry and crude oil processing, Prague, was established.

Chemopetrol encompasses 10 concern enterprises (nine production and one distribution enterprise) and five research institutes and participates in the development of the chemical industry and the supply to the national economy of the required chemical and oil products. Its production constitutes 23 percent of the CSSR chemical production, and its capital assets, 29 percent of those of the chemical industry. Chemopetrol employs 19 percent of the industry's labor force. Its production volume is 20 percent of that of the CSR Ministry of Industry, and at present it is the key component of the CSSR chemical industry.

The concern produces more than 2,000 products (plastics, synthetic rubber, chemical fibers, fuels and lubricants, liquid fuels and gas for heating, asphalts, analytical chemicals, chemical fertilizers, inorganic pigments and technical salts, plant protectants, and chemicals for the automobile industry). The concern's overall volume if Kcs 21 billion. About 7 percent of the overall volume of production is assigned to the domestic market, 15 percent is exported (about Kcs 4 billion worth), and 78 percent is destined for other industrial sectors. Chemopetrol has jurisdiction over the domestic transportation of crude oil by the Druzba pipeline which in 1980 will carry almost four times as much crude oil as it did in 1965.

The tasks of the Sixth Five-Year Plan and the concern's stated 1995 goals aim primarily at securing the development of the priority programs.

Development of fuels and lubricants--in 1975 Chemopetrol's proportion in supplying national requirements was:

automobile and industrial oils:

motor oils	71	percent
transmission oils	69	"
bearing oils	37	"
turbine oils	100	"
compressor oils	66	"
cylinder oils	100	"
asphalts	32	"
paraffin and ceresin	84	"

Production of chemical fibers--constitutes 7 percent of Chemopetrol's production volume and 33.8 percent (1980) of national production.

Production of chemical fertilizers--constitutes 11 percent of Chemopetrol's production volume.

Production of plastics and synthetic rubber--constitutes 18 percent of Chemopetrol's overall production; Chemopetrol is the CSSR's largest producer of thermoplastics and elastomers. Its overall production capacity is 400,000 tons a year, or 26 kilograms on a per capita basis for the CSSR. The lion's share of this production is supplied by the concern enterprises CHZ CSSP [Chemical Works of Czechoslovak Soviet Friendship] in Litvinov, Kaucuk in Kralupy nad Vltavou, and Spolana in Neratovice, where petrochemical production facilities were established in the Fifth and Sixth Five-Year Plans in cooperation with the GDR.

Capital Investment--between 1965 and 1970 construction of 80 new production facilities was started in the overall sum of Kcs 5.5 billion; between 1970 and 1975 Kcs 11.3 billion was invested, and in the Sixth Five-Year Plan, investments are expected to amount to Kcs 17.3 billion, which represents 57 percent of overall investments into the CSR chemical industry.

Chemopetrol cooperates with CEMA countries within the framework of bilateral and multilateral cooperation. Concern enterprises and research institutes have agreements on direct scientific and technical cooperation with 25 organizations in the USSR, the GDR, and the Polish People's Republic. To broaden its production program Chemopetrol is acquiring licenses from Holland, Japan, the FRG, the United States, and other countries.

The production program of the Chemopetrol concern is designed not only to meet the needs of the CSSR, but also to intensify the international exchange of goods. Over the last 10 years structural changes have taken place in the export of goods. Currently, the sustaining export program consists of plastics, synthetic rubber, inorganic pigments, and other petrochemical products. Foreign trade organizations, especially Chemopetrol Prague and Petrimex Bratislava, take care of exports and imports.

Production enterprises

Chemopetrol, concern enterprise Chemical Works of Czechoslovak Soviet Friendship, Litvinov

Production program: low-pressure polyethylene, polypropylene, ammonia, automobile and technical gasoline grades, diesel fuel, heating oil, asphalts, consumer gas, liquefied gas, technical gases, alcohols, formaldehyde, phenols, aromatic hydrocarbons, liquid carbon dioxide, dry ice, catalysts, sulfur.

Annual production of the enterprise exceeds Kcs 8.4 billion; work force 11,156 workers.

Chronology:

May 1943--start of production of synthetic gasoline and diesel fuel from brown coal

1 January 1946--establishment of Stalin Works, national enterprise at Horni Litvinov, near Most

27 July 1946--transfer of the enterprise at Horni Litvinov, Soviet war booty given by the USSR to Czechoslovakia

20 February 1958--the enterprise was awarded the Order of Work

24 February 1962--name of the enterprise changed to Chemical Works of Czechoslovak Soviet Friendship, a national enterprise

1 July 1965--incorporation of the enterprise into the VHJ Enterprise for the Processing of Crude Oil and Coal, Prague (now Chemopetrol)

September 1972--transition of the enterprise to exclusive processing of crude oil

1 January 1975--change of name of the enterprise to Chemopetrol, concern enterprise Chemical Works of Czechoslovak Soviet Friendship, Litvinov

28 April 1975--start of operation of the ethylene pipeline CHZ CSSP-Spolana, Neratovice

6 September 1975--start of operation of international ethylene pipeline Boehlen-CHZ CSSP, Litvinov

10 September 1975--start of operation of polypropylene unit

31 July 1976--start of operation of polyethylene unit

28 April 1980--start of ethylene pilot plant unit

Chemopetrol, concern enterprise Kaucuk, Kralupy nad Vltavou

Production program: synthetic rubber (Kralex), polystyrene materials, gasoline, diesel fuel, heating oils, liquefied hydrocarbon gases.

Annual production of the enterprise, Kcs 4.5 billion; work force, 3,128 employees.

Chronology:

1 January 1952--founding of national enterprise Slovchema at Kalna

19 March 1956--change of name and seat to Kaucuk, national enterprise at Kralupy nad Vltavou

4 August 1958--start of construction of facilities for the production of synthetic rubber as a youth project

1 July 1963--start of trial operation

1 January 1966--enterprise incorporated into the VHJ Chemopetrol

6 December 1974--start of test operation of new oil refinery

1 January 1975--change of name of enterprise to Chemopetrol, concern enterprise Kaucuk, Kralupy nad Vltavou

March 1978--start of operation of the complex for the isolation of butadiene

Chemopetrol, concern enterprise Koramo, Kolin

Production program: exclusive producer of oils in the CSR, of paraffin in the CSSR, and also producing plastic lubricants and insulation asphalts for construction purposes. Exports to 17 countries, 15 percent of its overall volume of production. Annual production, Kcs 0.8 billion; work force, 815 employees.

Chronology:

28 May 1901--founding of the Czech Company for the Refining of Oil Ltd. at Kolin

27 October 1945--nationalization of Vacuum Oil Company Ltd.

1 January 1946--enterprise incorporated into national enterprise Mineral Oil Refineries at Pardubice, later in Prague

1 January 1950--establishment of independent enterprise Kolin Refinery of Mineral Oils, national enterprise

1 January 1962--enterprise abolished and the Kolin works were incorporated into the Stalin Works, national enterprise

1 January 1966--reestablished as an independent national enterprise and incorporated into the VJH Works for the Processing of Oil and Coal, Prague (now Chemopetrol)

26 June 1968--start of production of new solvent paraffin production facility

27 May 1976--received award For Accomplishments in Construction

1 January 1975--name of enterprise changed to Chemopetrol, concern enterprise Koramo, Kolin

Chemopetrol--concern enterprise Ostramo, Ostrava

Production program: motor, automobile, transmission, bearing oils; preservatives; paraffins; ceresins; diesel oil; heating oils. Also regenerates used oils, yearly less than a fifth of the overall quantity of virgin oil used is being processed.

Annual production Kcs 0.3 billion; work force 596 employees.

Chronology:

1 September 1888--founding of the future Ostrava Refinery of Mineral Oils

27 October 1945--nationalization of the Company for the Production of Mineral Oils S.S.V.C., Moravska Ostrava enterprise

1 January 1946--incorporation of enterprise into national enterprise Mineral Oil Refineries

1 January 1950--establishment of Ostrava Refinery of Mineral Oils, national enterprise

1 January 1962--enterprise abolished and the Ostrava works incorporated into Slovnaft, national enterprise

1 January 1966--enterprise reestablished as independent national enterprise Ostrava Refineries of Mineral Oils and subordinated to VHJ Enterprises for the Processing of Crude Oil and Coal, Prague (now Chemopetrol)

30 April 1964--awarded Order of Work

Chemopetrol--concern enterprise Paramo, Pardubice

Production program: highway and construction insulation asphalts; automobile, transmission, turbine, hydraulic, preservation, heating and other oils; paraffins and diesel oils.

Annual production of the enterprise, Kcs 1.1 billion; work force, 876 employees.

Chronology:

1889--building of steam boiler room of the future Crude Oil Refinery at Pardubice

27 October 1945--nationalization of the enterprise Fanta Works Ltd., Prague with seat at Pardubice

1 January 1946--enterprise at Pardubice incorporated into national enterprise Mineral Oil Refineries

1 January 1950--establishment of independent national enterprise, Mineral Oil Refineries Pardubice

20 February 1958--awarded Order of Work

1 January 1962--enterprise disbanded and incorporated into Stalin Works, national enterprise

1 January 1966--the Pardubice works established as independent Pardubice Mineral Oil Refineries, national corporation and incorporated into VJH Crude Oil Refining and Coal Processing Enterprises, Prague (now Chemopetrol)

December 1969--start of polyethylene derivatives production

February 1971--start of production of sheet iron drums for asphalt products

1 September 1973--start of trial run of atmospheric crude oil distillation

1 January 1975--change of name of enterprise to Chemopetrol, concern enterprise Paramo, Pardubice

Chemopetrol, concern enterprise Prerov Chemical Works, Prerov

Production program: exclusive producer of titanium white in the CSR; also produces iron-based pigments, sulfuric acid, chemical fertilizers.

Annual production of enterprise Kcs 0.7 billion; work force 1,557 employees.

Chronology:

February 1894--founding of First Moravian Farmers Fertilizer and Chemical Works Ltd., Prerov

18 May 1945--name of enterprise changed to Farmers Chemical Works

27 October 1945--nationalization of enterprise Farmers Chemical Works Ltd., Prerov

1 January 1946--enterprise incorporated into national enterprise Synthesia, Chemical Works, Semtin

1 July 1949--removed from Synthesia, established as national enterprise Chemical Works Prerov

1 April 1958--enterprise abolished and incorporated into Moravian Chemical Works, national corporation

1 January 1966--enterprise reestablished as Prerov Chemical Works, national enterprise

1 January 1969--enterprise incorporated into VHJ Chemopetrol

1 January 1975--name of enterprise changed to Chemopetrol, concern enterprise Prerov Chemical Works, Prerov

1976-1978--construction of new sulfuric acid manufacturing facility

January 1979--start of full operation

Chemopetrol, concern enterprise North Bohemia Chemical Works, Lovosice

Production program: chemical fertilizers, viscose rayon, sulfuric acid, nitric acid, carboxymethylcellulose, Glauber salt, sodium fluorosilicate.

Annual production of the enterprise, Kcs 1.8 billion; labor force 3,378 employees.

Chronology:

29 January 1903--start of production of sulfuric acid and of superphosphate

1923--start of viscose rayon production

27 October 1945--nationalization of enterprise Czech Rayon Works Ltd., Lovosice

1950--start of production in new sulfuric acid production facility

1 January 1951--establishment of national enterprise Chemical Fertilizer Works, Lovosice

October 1954--start of nitric acid production

November 1954--start of ammonium nitrate with limestone production

1 February 1957--start of production of carboxymethylcellulose

1 April 1958--establishment of North Bohemia Chemical Works at Lovosice (with existing enterprises such as among others Czech Silk and Chemical Fertilizer Works incorporated into it)

1 July 1960--start of production of viscose cord rayon

29 June 1964--start of production of new superphosphate and sodium fluorosilicate manufacturing facility

October 1964--start of production of granulated superphosphate

February 1967--start of production of Glauber salt

November 1967--start of production of combination fertilizer NPK 1 and of calcium nitrate

1 January 1969--enterprise incorporated into Chemopetrol VHJ

June 1969--start of production of new nitric acid production facility

21 June 1973--awarded Order of Work

1 January 1975--change of name of enterprise to Chemopetrol, concern enterprise North Bohemia Chemical Works, Lovosice

23 February 1978--start of production of liquid nitrogenous fertilizer DAM 390

Chemopetrol, concern enterprise Silon, Plana nad Luznici

Production program: polyester rayon (tesil), polyester cable, polyamide fibers (silon), polyamide monofibers (strings, pile, synthetic horsehair), tesil stuffing (tevyro), textured polyamide and polyester rayon.

Annual production of enterprise, Kcs 0.7 billion; work force, 2,250 employees.

Chronology:

1 January 1950--establishment of Silon, national enterprise at Plana nad Luznici and start of production of polyamide rayon silon

1 May 1955--awarded the Order of the Republic

27 April 1956--start of production of polyamide monofibers

October 1958--start of production of polyester rayon tesil

24 October 1966--start of production of new polyester rayon production facility

1 January 1969--enterprise incorporated into VHJ Chemopetrol

1 January 1975--name of enterprise changed to Chemopetrol, concern enterprise Silon, Plana nad Luznici

Chemopetrol, concern enterprise Spolana, Neratovice

Production program: polyvinylchloride (neralit), caprolactam, cyclohexanone, viscose staple, sodium hydroxide, chlorine, sulfuric and hydrochloric acids, pesticides, consumer chemicals, chemicals for automobile industry, saccharin, Glauber salt; 80 percent of production has joint raw material, supply and machine resources with GDR industry.

Annual production of enterprise, Kcs 3.2 billion; labor force 5,400 employees.

Chronology:

1898--founding of production facility for the production of chemicals, especially ammonia at Neratovice

17 September 1939--founding of chemical factory for the production of plant protectants, protective coatings, chemicals for automobile industry and analytical chemicals, simultaneous start of construction of new facilities, the basis of today's enterprise

28 October 1946--start of trial run of viscose rayon production

1 December 1949--start of operation of electrolytical facility

. May 1955--start of operation of sulfuric acid production facility

7 December 1968--start of production of caprolactam

1 January 1969--enterprise incorporated into VHJ Chemopetrol

3 August 1972--start of construction of petrochemical production facility designated I.B-Polyvinyl Chloride (PVC) Suspension Works

1 January 1975--name of enterprise changed to Chemopetrol concern enterprise Spolana, Neratovice

17 May 1975--production start of sulfuric acid production facility

12 June 1975--production of first polyvinyl chloride batch

1 May 1978--awarded Order of Work

Research Institutes

Chemopetrol, concern special purpose organization Technical Engineering Institute, Neratovice

Engaged in designing, construction and pilot plant verification of research tasks for the scientific and technical base of the concern.

Chronology:

1 July 1976--establishment of Chemopetrol, concern target organization Technical Engineering Institute, Neratovice

Chemopetrol, concern special purpose organization Institute for Chemical Fiber Processing, Ceska Trebova

Concentrates on developing new types of chemical fibers and new auxiliary preparations for the textile industry; offers technical services to textile industry processing chemical fibers. Institute also includes State Testing Station No 220, which evaluates chemical fibers and auxiliary preparations for the textile industry.

Chronology:

15 June 1960--establishment of the Chemical Fiber Processing Institute at Ceska Trebova

12 July 1966--establishment of State Testing Station No 220 of the Chemical Fiber Processing Institute

1 January 1969--incorporation of the institute into VHJ Chemopetrol

1 January 1975--change of institute's name to Chemopetrol, concern target organization Chemical Fiber Testing Institute, Ceska Trebova

12 November 1976--establishment of main center for scientific and technical development (VP VTR YZCHV)

Chemopetrol, concern special purpose organization Research Institute for Inorganic Chemistry, Usti nad Labem

The field of activity comprises chemical fertilizers and the technologies involved, application of chemical engineering operations, control of trial emissions, electrochemical processes in electrolysis, development of new analytical methods and sensitive measuring and control systems.

Chronology:

1 January 1952--establishment of Research Institute for Inorganic Chemistry (VUAnCH) at Usti nad Labem as part of the Ministry of the Chemical Industry

1 January 1969--VUAnCH incorporation into VHJ Chemopetrol

1 January 1975--change of institute's name to Chemopetrol, concern special purpose organization Research Institute for Inorganic Chemistry, Usti nad Labem

Chemopetrol, concern special purpose organization Research Institute for Marcomolecular Chemistry, Brno

Activity designed to improve existing technologies, assortments and the application of industrially produced polymers in the CSSR, mainly of polyolefins and polyvinyl chloride; considerable research is done on developing new auxiliary compounds.

Chronology:

1 January 1956--conversion of the Brno work place of the Research Institute for the Application of Plastics at Gottwaldov to the Research Institute for Macromolecular Chemistry, Brno

Chemopetrol, concern special purpose organization Research Institute for Synthetic Rubber, Kralupy nad Vltavou

Works on improving existing production technologies of polystyrene plastics, synthetic rubbers by developing new types of polystyrene materials. Part of program is also research in the field of monomer production technology.

Chronology:

1 January 1952--conversion of the Research Institute CZKG (Czechoslovak Leather and Rubber Plants, national corporation) at Gottwaldov to the Research Institute for Synthetic Rubber

1 January 1959--the institute was abolished as a budgetary unit and incorporated as a research center into national enterprise Kaucuk, Research Institute for Synthetic Rubber

1 January 1966--incorporated jointly with national enterprise Kaucuk into VHJ Enterprises for Crude Oil and Coal Processing in Prague (now Chemopetrol)

1 July 1976--establishment of Chemopetrol, concern special purpose organization Research Institute for Synthetic Rubber, Kralupy nad Vltavou.

Distribution Organization

Chemopetrol, concern enterprise Benzina, Prague

Transports crude oil and supplies needed, fuels, lubricants and other oil products for automobiles and transportation sectors of the national economy; has collection and purchasing centers for used mineral oils.

Chronology:

1 January 1949--establishment of Benzinol, national enterprise

1 January 1953--Benzinol and other supply components converted into a network of Chema sales outlets organized by krajs

1 April 1958--amalgamation of sales centers and establishment of Benzina, Distribution of Fuels, national enterprise

1 July 1961--change of name of enterprise to Benzina, national enterprise

6 September 1961--establishment of Ropovod enterprise

1 July 1965--enterprise incorporated into VHJ Enterprises for Crude Oil and Coal Processing, Prague (now Chemopetrol)

30 April 1972--received award For Accomplishments in Construction

1 January 1975--name of enterprise changed to Chemopetrol, concern enterprise Benzina, Prague

8664
CSO: 2402

CZECHOSLOVAKIA

BRIEFS

'ROBOT' AT WORK--A section of "flexible production system"--the first of its kind in a CSSR engineering plant--consisting of an "industrial robot" and a group of three machines with digital controls went into operation in the heavy engineering works in Martin on 27 June. The system will raise productivity and save manpower. [Bratislava PRAVDA in Slovak 28 Jun 80 p 2 AU]

CSSR GEOLOGISTS IN MONGOLIA--According to graduate geologist Libuse Mayerova, who until recently worked in the headquarters of a Czechoslovak geological team in Ulaanbaatar in Mongolia, CSSR geologists there are at present engaged in exploring "interesting" deposits of wolfram ores in the area around Undur Cagan Obo and Zulget; several new deposits of fluoride also have been discovered, the most significant in Chulyn Cholbo. Next year a team of CSSR geologists will begin working in the Gobi Desert. [Prague LIDOVA DEMOKRACIE in Czech 21 Jul 80 p 1 AU]

FEED FROM INDUSTRIAL SCRAP--More than 1 million kilograms of protein feed in the form of gluten hydrolysate is produced from industrial scrap at the Otrokovice branch of the Svit factory based in Gottwaldov. The scrap obtained during chrome leather tanning and shoe production is boiled, thickened, dried and eventually mixed with oil cakes, pellets and other feed components. This modern facility developed by the Research Institute of Leather Processing in Gottwaldov delivers daily about 4,200 kilograms of the feed to its consumers. Besides used for fattening hogs, the feed is being tested on cattle. [Bratislava ROLNICKE NOVINY in Slovak 16 Jul 80 p 2]

CSO: 2402

BRIEFS

MICROPROCESSOR COMPUTERS--The computer main department of the Central Physics Research Institute is developing a family of microprocessor computers. The new computers are being designed to control a variety of systems and processes. At present they are working on a program for directing traffic for the Budapest Transport Enterprises. VILATI [Electrical Automation Institute] which produces minicomputers at its Control Technology Equipment Factory [Iranyitastechnikai Berendezesek Gyara] in Eger is also attempting to reduce size. Smaller enterprises can use these minicomputers to direct and control production, make technical and economic calculations and for organizing management. [Budapest MAGYAR IFJUSAG in Hungarian No 27 Jul 80 p 4]

FIBER OPTICAL DATA TRANSFER SYSTEM--A year has passed since the Telecommunications Research Institute [Tavkozlesi Kutato Intezet] demonstrated its optical data transfer equipment. A light-conducting connection was established between a universal keyboard and a conventional display. Although the distance involved was very short, transmission took place at the speed of 2 M bits per second via the fiber optic system. It is hoped that domestic experiments with glass fibers will lead to additional results and that fiber optical systems will become commonplace in the not too distant future. [Excerpt] [Budapest SZAMITASTECHNIKA in Hungarian No 6, Jun 80 p 3]

CSO: 2502

POLAND

SPACE RESEARCH DEVELOPMENT OUTLINED

Warsaw ZYCIE WARSZAWY in Polish 26 Jun 80 pp 3, 5

[Interview with Prof Jan Rychlewski, chairman of the Polish Academy of Sciences Committee for Space Research, by Jan Ruranski: "On the Second Anniversary of the Polish Space Flight: A Look into the Future;" date of interview not given]

[Text] [Question] Two years have passed since that memorable space flight of the first Pole, a flight whose program was of scientific and research significance. From the perspective of these 2 years, how can the scientific results of the experiments conducted during the flight be evaluated?

[Answer] I will begin with the technical experiments. Here we wanted to grow, under space conditions, special types of semiconductor crystals. These ternary crystals are very difficult to achieve because of the force of gravity which makes it impossible to achieve a homogeneous, isometric crystal structure under conditions on Earth. As shown by our experiments, under conditions of weightlessness, satisfactory homogeneity can be achieved in 50 percent of the remelted material (on Earth, it is barely 15 percent). Thus our experiments confirmed the technical and technological possibility of producing semiconductor crystals in orbital laboratories.

But we also must remember the research possibilities and results that are created for us by observing ongoing processes in crystals, processes that proceed differently on Earth under the force of gravity. For example, in space new and hitherto unknown phenomena have been discovered in remelted crystals, namely, a very thin surface layer of the semiconductor having unusual characteristics. This and other phenomena require still more research which, after all, others are also conducting.

The second series of experiments was associated with medicine. We tested in space our original device to investigate a cosmonaut's exertions. The device, called the cardiolider, allows one to measure as well as control exertion during exercise in orbit. This is especially important during long-term flights of many months when cosmonauts must exert much effort to remain physically fit under conditions of weightlessness. The device was

a complete success and to this day is used to train cosmonauts on Earth as well as on the Salut 6 orbital station. In addition, the device is being used in aviation and sports medicine. It also can be used in the rehabilitation process when the control of exertion is especially critical.

[Question] There also was the "Earth" experiment which was slightly fouled up by the weather...

[Answer] It is a fact that in many photos clouds blocked parts of the photographed terrain. But it should be remembered that the purpose of this experiment was to master the methodology of deciphering and analyzing satellite pictures. After all, no one will do this for us. We ourselves must gain the knowledge of how to analyze and utilize satellite pictures of our country because, for example, the analyses of pictures for agricultural purposes raise one set of problems in the Soviet Union or the United States, while the specifics of our agriculture raise others for us. As a result of M. Hermaszewski's flight we obtained several hundred pictures which enabled our research institutes to develop the technology for their processing and to analyze them for the needs of various sectors of the economy, including agriculture, geodetics, geology and environmental protection.

And finally, the entire preparation for the Polish-Soviet program for the scientific flight was our very own--what I would term--organizational experiment. It was a test of the competence and organizational preparedness of Polish science to actively explore space. The test turned out positive.

[Question] Much has been said and written in the press about the practical benefits of space research. Can it be said today that the research results obtained during Miroslaw Hermaszewski's flight have been applied in practice in the economy?

[Answer] This is not a completely proper question. One should not present the problem of the effectiveness of space research in this way. One flight in space cannot bring immediate material benefits. Such results can be achieved only after a complete space research program is completed. But as long as the question has arisen regarding the practical results of the flight, I will reply. Concerning the technical experiments, the small semiconductor crystals obtained from the experiments were cut up into pieces during the investigation process, and we will not produce anything from them. However, our colleagues from the Polish Academy of Sciences [PAN] Institute of Physics, who are concerned with these crystals, are thinking of using a fragment of one of the crystals to design an infrared detector for subsequent experiments in space. Concerning the medical experiments, as I have already mentioned, the devices and equipment built for space purposes are being used in Poland. The purpose of the "Earth" experiment was to master the technology of analyzing satellite pictures, and that goal was achieved. The agricultural map of the Sroda Slaska region and the map of the Wyzyna Slaska and Krakow-Czestochowa forests, developed on the basis of pictures taken in space, are of practical significance. Such

maps prepared for the entire country would be of great significance to agricultural experts.

[Question] What can we expect in the next few years concerning the participation of Polish scientists in space research?

[Answer] We have a clear, outlined program for the next 5 years, actually the next 6 years. It is an extensive, ambitious program, but one that considers the country's potential. I will present it in brief, describing the main research trends.

In the field of astrophysics we have been working for more than 10 years, and our achievements have been significant. Thus we will continue these investigations. Among other things, we will be concerned with waves in plasma, solar wind and solar radiation. We also are preparing a very ambitious experiment called "POLRAD." This will be a continuation of the 1973 "Kopernik" experiment, but much more complicated. We are now working on a very complicated apparatus for this experiment, and I believe that we will place it in orbit in about 1984.

In the field of satellite geodetics we will be involved in general studies of such problems as the shape of the Earth and movements of tectonic plates, as well as very practical problems such as the accuracy of geodetic networks. We are also working on an interesting and innovative experiment. It is too early to talk about the details of the experiment; I can only say that it will be based on investigating the nonuniformity of the distribution of masses in the Earth by measuring the relative velocities of motion of three sputniks located in orbit in a special manner. I will add that two of the sputniks will be completely Polish designs. The distribution of masses of massive inclusions of the external layer of the Earth's crust is a very interesting problem, from the practical as well as investigative viewpoint Also, we should not forget the devices that we are building, including a very accurate laser rangefinder (which will permit measurements of distances to satellites on the order of 2,500 km within an accuracy of 12 or so cm!) and a device to orient space satellites superaccurately. This last device will be mounted on a gamma radiation telescope which France and the Soviet Union intend to place in orbit.

In the area of remote sensing, our goal is to develop a satellite information system for the national economy by the end of the 5-year period. The information will relate to agriculture, geology, environmental protection, geodetics, cartography, territorial planning and water resources management.

Presently, for this purpose, work is ending at the Institute of Geodetics and Cartography on placing into operation a digital flowline to process satellite pictures.

Space communications is an activity of great economic significance. We will expand the satellite communications station in Psary, and we will join the

international satellite communications system. We also are concerned about air and maritime navigation. For us satellite maritime navigation is especially important. Today all modern fleets are equipped with satellite navigation equipment. Some of our ships also have these devices, but we are concerned with reequipping the entire fleet.

Another subject in this area is so-called direct television. We already have divided the work in this area within the frameworks of the Interkosmos and Intersputnik programs, and we are responsible for participating in developing a general concept for a direct TV satellite system and work in the area of ground equipment, that is, central antennas and receiver attachments.

Space meteorology is another activity. The goal here is obvious: we must link up permanently with satellite information for continuous weather information service. Presently such information is being used on a part-time basis, but the concern here is to significantly improve the reliability of short-term forecasts with the aid of satellite information. The Krakow section of the Institute of Meteorology and Water Resources Management is deeply involved in this subject.

Naturally, we will continue our work in the area of space technology. We want to conduct certain experiments with metal alloys and tests to obtain certain superclean chemical substances. Even though I believe that we will not participate in manned flights in this current 5-year period, we will continue medical tests in which the Military Institute for Aviation Medicine has made important contributions.

Finally, it should be emphasized once again that our space research program is part of the joint Interkosmos program. Poland or any other country of its size could not conduct space research on its own. Only the total of the work conducted by all the partners in the framework of the Interkosmos program can provide significant results. Of course, the base here is Soviet space technology, without which research on such a scale would be impossible.

11899
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DEVELOPMENT OF STEEL, TITANIUM ALLOYS DESCRIBED

Warsaw ZYCIE WARSZAWY in Polish 26 Jun 80 pp 3, 5

[Article by Tadeusz Podwysocki: "Composites for Steel and Titanium"]

[Text] There was a time when it was only a dream for many generations of engineers. Today it is becoming a reality. We are talking about the creation and design of materials having predetermined properties. Such is the possibility in materials engineering in this epoch of scientific and technological revolution. Without new materials it would be difficult to imagine automation, mechanization, space and computer technology, atomic energy and even the production of many traditional devices that operate at high temperatures and pressures and speeds and interact with corrosive substances and radiation. It is at the Institute for Materials Engineering of Silesia Polytechnic in Katowice that a group of specialists is involved in the creation and compounding of materials with new properties and characteristics.

"Presently the most applied structural materials continue to be metal alloys," explains Prof Dr Adam Gierek, the director of the institute. "The possibility of obtaining new metal alloys and improving existing ones appeared at the moment when these metals were viewed from another, more extensive viewpoint, and not gauged by classical physical metallurgy."

Materials engineering took a big step forward by improving structural materials--metals and their alloys. Infusible alloys with titanium or aluminum are created in a liquid steel or cast-iron bath. We have begun to use the modification process in our metallurgy industry. This serves to produce some grades of high-speed tool steel. The essence of this process depends on the introduction of calcium metal--in thousands of parts of a percent--to the ladle during steel tapping. What does this do? It causes the refinement of carbides in the structure which, in practice, causes steel plasticizing, since later it is subject to plastic working. The result is to increase material yield by 10 percent.

Similar results were obtained by modifying heat-resistant chrome-aluminum steels (Baildon type steel) with calcium metal. The results of work by

scientists involved with materials engineering proved that it is beneficial to modify high-manganese austenitic steel with rare earth elements. This process of modification is also used to obtain casting and creep-resistant alloys.

Innovative Family of Steels

One of the goals of the Institute for Materials Engineering is to provide the national economy with technologies that will serve to restrict the growing raw materials crisis. This concerns not only obtaining substitutes for various materials, but also obtaining materials having better characteristics from still abundant materials. An example of such activity is the development of technology for two families of steels that are free of nickel, an expensive additive.

The family of FERMANA-type steels, developed by the Katowice institute, contains about 30 percent manganese, which replaces nickel as an austentic additive, and 9- 10 percent aluminum in place of chrome (anticorrosion function). Steels of this family not only are 10 percent lighter, but also 30 percent stronger, than the nickel steels now being used.

Also, a significant achievement of the Institute for Materials Engineering in Katowice is the development of a whole family of CHROMAN-type steels (containing iron-chrome-manganese) that successfully replace stainless steel, the traditional steel used to date. These steels can replace nickel alloys used in designing chemical equipment and so forth.

The technology has been mastered for the production of pipes, sheets and castings for large valves for the chemical industry from CHROMAN steels. Thus the Mala Panew Mill produced several such valves for the Tarnow Chemical Plants. They have been in operation for nearly 1 year in a nitric acid environment. What do the professionals think about this? They say that these valves perform better than valves made from stainless steel with nickel additive. Products made from CHROMAN-type steel perform quite well in sea water and very polluted river water. This steel can serve as an excellent replacement for nickel steel that has been utilized thus far. Moreover, as we start up production we are finding increasing uses for this steel by designers and industries producing various products from stainless steel. Two innovative groups of steel are creating an entirely new and quite unusual opportunity for our country. Under the aegis of the United Nations, a structure is being prepared for the installation of the next generation thermonuclear TOKOMAK, which is supposed to have a positive energy balance.

"Soviet specialists who are participating in this building program for a thermonuclear reactor are interested in the results of our work on nickel-free steels," explains Prof Dr Adam Cierek.

The point is that the thermonuclear reactor is enclosed in toroidal-type traps with a plasma consisting of a mixture of deuterium and tritium.

It turns out that in building this toroidal type trap, stainless steel with nickel additive cannot be used. Why? Because a radioactive material would be obtained that has a long half life. But steel from the FERMANA and CHROMAN groups could serve as excellent material for designing the toroidal trap. The technology of aluminizing steel has been developed and applied at the Katowice Institute for Materials Engineering. Currently 140,000 so-called crossbars, parts for the FIAT 125p, and 4,000 mufflers are being aluminized annually. Aluminizing steel used in the design of toroidal equipment can greatly improve the container's qualities for plasma in a TOKOMAK. Samples of steel are supposed to be sent to scientific institutions in the USSR that are involved in thermonuclear energy. If experiments confirm current expectations, then these two families of innovative steels perhaps will make it possible to build in Poland the toroidal systems for the TOKOMAK.

Metallurgy for Tomorrow

Titanium and its alloys have all these advantages: corrosion resistant, light and creep-resistant. It is the material of the future, thus the interest in titanium on the part of scientists from the Institute for Materials Engineering in Katowice. It is found in the Suwalki iron ore deposits. As the professionals assure us, titanium belongs to the intrusive elements in the metallurgy of iron, increases the density of blast-furnace slag and greatly impedes the smelting of iron. Experience has shown that iron ore containing 10-15 percent titanium cannot be completely utilized in metallurgy. That is how it was in Norway and in other places, but in the past several years titanium has become an exceptionally valuable and sought after raw material. Titanium is one of the most prevalent elements on our globe. Among the metals, it is in seventh place, and there is 10 times as much titanium as nickel, copper, zinc and lead combined!

But production of titanium costs at least 25 times as much as production of aluminum. If in previous years several cents was paid for a kilogram of titanium ore, then a kilogram of titanium metal would have cost scores of dollars. But despite these costs, while world production in 1947 was only 2 tons, 10 years later it increased to 20,000 tons. Currently the United States produces 45,000 tons and the USSR over 35,000 tons.

What is the Origin of the Success?

At the Katowice Institute for Materials Engineering I am looking over various surgical tools, implants and endoprotheses--grafts of titanium that replace bones and serve as screws, cores, rivets, wire and plates to connect bones. But titanium is not only a valuable material in medicine and biology. Machine parts and equipment for the food industry made from titanium resist corrosion and are reliable for a much longer time than stainless steel parts.

"We have taken an important step in research," states Prof Dr Adam Gierek. "We wish to create the material-technological base for using titanium. In

this way our engineers adapt themselves to this valuable metal, mastering its technological and design applications. These are lead-time activities with thoughts of the future."

In reality titanium is an excellent material with properties comparable to stainless steel relative to hardness and annealed tensile strength; at the same time it is almost twice as light. Also, titanium has six times the mechanical strength of aluminum. Scientists foresee its applications not only in industrial equipment, but also in ships, railroad cars and atomic reactors. Titanium can be a great opportunity for Polish metallurgy when we develop the Suwalki deposits.

Opportunity for Composites

In August 1978 the PAN Committee for the Study of Sciences and the Committee for the Science of Materials issued a professional report concerning composites and their projected applications in various branches of technology. Prof Dr Adam Gierek was a member of the group that issued the report.

PAN experts indicated that we must strive after 1980 to extend the scope of research in the area of composite materials. The interministerial problem on basic research (the PAN and the Ministry of Science, Higher Education and Technology), which is coordinated by the Institute for Materials Engineering in Katowice, addresses this area; this problem relates to materials for technological and power equipment operating at higher temperatures.

Work being conducted at the institute on materials for the power industry concern the design of special heat-resistant and creep-resistant properties for new aluminized alloys of iron, for iron alloys that are diffusion-coated, for alloys with nickel, titanium and its alloys, and for other composites.

Prof Dr Adam Gierek believes that among the standard design composites, greater emphasis should be placed on cement-sand matrix composites, ceramic or metallic reinforced fibers and impregnated plastics. These materials, states the professor--in addition to composites based on polymers reinforced with various fibers, especially glass fibers and, in the future, graphite fibers--should find applications in construction as a substitute for cast iron for manufacturing some machine parts and equipment that operate under pressure.

Research of an investigative nature on ceramic matrix composites is being conducted at the Institute for Materials Engineering in Katowice and other places.

11899
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LONG-RANGE COMPUTER DEVELOPMENT, PRODUCTION OUTLINED

Warsaw INFORMATYKA in Polish No 5, May 80 pp 4-6

[Article by Janusz Gwiazda, Secretariat of the Information Science Committee: "Polish Information Science Prospects"]

[Text] With the start of the current decade, the position of Poland's computerized information industry, in close association with the computerized information industries of the other socialist countries, should improve by profiting from the experience of previous years. The current decade should also bring significant progress in hardware technology and design. The process of modernizing the technical base for information science will be initiated in the 1980s; this will be based on dispersed processing, ever-increasing applications of microprocessors and minicomputers and microcomputers, and on the development of remote processing systems.

The preferred areas of application will be those which could most effectively eliminate the bottlenecks in Poland's economic development, namely:

computer-aided socioeconomic planning functions at the central, ministerial and voivodship levels;

improving material, energy and labor management at all management levels;

improving technological processes by automating the technical preparations of production in those branches of industry that are especially important for exports growth and for supplying the domestic market;

raising the standard of some types of services for the people.

Systems for specific levels (central, ministerial, plant and so forth) should be closely linked with one another and their operations evaluated in accordance with verifiable effectiveness indicators.

The development of a central management information system, which would operate on the basis of separate subsets of the data bases for government and ministerial systems, should be preceded by a study as soon as possible.

Among the government computerized information systems, the CENPLAN, SPIS, PESEL and SINTO systems will be expanded and improved. A fifth system in this category planned for the future will be the SEIF financial information records system. This will be the result of developing a ministerial computerized information system for the Ministry of Finance which will be linked to a network of computing centers and will serve banks and General Savings Bank [PKO] units, and of placing into operation the SIR computerized accounting information system.

The hardware base for government and ministerial systems should be expanded with due regard for the general recommendations concerning the policy of equipping Polish computer centers with minicomputers and large JS EMC [Uniform System of Electronic Digital Computers]. Ministries not expanding their own bases will use government computerized information systems and the services of computer centers subordinate to the Information Science Association.

The computerized information systems to be developed must have interconnection capabilities in order to improve their operating effectiveness. The following four types of interconnections can be differentiated:

informational-functional interconnections. These signify the existence of continuous or periodic information flow between systems in the form of data on traditional machines and carriers or via data transmission. Depending on need, these interconnections should occur among computerized information systems for all levels and types in so far as special regulations do not prohibit them, for example, those regulations protecting state or official secrets;

logical-programmatic interconnections. These should exist in a vertical system (among systems at specific levels) as well as in a horizontal system (among systems that are technically and organizationally linked). Units that perform coordination functions should be responsible for these interconnections;

technical interconnections. Solutions based on data transmission equipment will be developed only in the most justified cases. For all other cases, the use of traditional sources of communications and data forwarding is recommended.

The degree to which computerized information systems will be integrated will depend on detailed economic calculations which consider the location of information transmitting and receiving points and data transmitting and receiving costs;

organizational interconnections. These exist among systems operating within the frameworks of individual workplaces, institutions, associations or ministries.

To assure greater vertical and horizontal cohesion of computerized information systems and to increase their effectiveness, work will continue on a national scale on standardizing program designs, system operation documentation, language classifications, codes to designate subjects and events amentable to recording. Input and output document forms, nomenclature, rate scales, computer center operating standards, information catalogs for specific areas of computer science applications, catalogs for standard software and the like will continue to be standardized. All units responsible for coordination on a national scale should participate in this work.

The Primary Tasks of Information Science

The basic task of information science is to help realize the following all-social goals:

improve the functioning of the state apparatus by developing government systems in the spheres of planning, statistics and population census, as well as for economic, organizational, technical and scientific information. The financial information system, which will improve the disbursement of financial resources and simplify their control, will play an important role;

improve management effectiveness by increasing the efficiency of ministries (especially the industrial ministries) and associations, and by considering the positive experience of the Ministry of Machine Engineering Industry and the Ministry of Mining. Also, making use of common data bases will have a significant effect on integrating individual management levels. In the largest enterprises the configuration of computer equipment now being introduced or expanded should facilitate the integration or computerized information systems in such a way as to encompass all the basic factors of production processed in financial-bookkeeping systems, that is, materials, machines and labor, in quantitative-qualitative ratios as well as in economic categories. This will occur because standard recording systems for material management, fixed assets management and work force management as well as systems for the technical preparation, planning and control of production that already have been implemented in many cases will have been integrated into the management information systems base.

improving the people's standard of living by developing and implementing computerized information systems that will improve the management of supplies, housing resources, PKP [Polish State Railways] and PKS [Polish State Airlines] passenger traffic service, tourist traffic and financial operations.

Among the primary areas that are expected to be computerized during the coming 5-year period, the following should be mentioned:

the development and application in three to five selected voivodships of additional CENPLAN system planning modules as subsystems for voivodship level planning;

the introduction and further expansion within the SPIS system framework of voivodship data banks for central and voivodship government needs;

the creation within the PESEL system framework of legal, organizational and technical bases for universal personnel identification, and also the creation in Warsaw and in one or two selected voivodships of banks for population census purposes;

conducting work on linking sets of the MAGISTER subsystem with individual regional data banks to assure their mutual cohesion and to improve the updating process;

the implementation within the SINTO system framework of automated patent, standardization and legislation information systems, as well as information systems regarding completed scientific research projects, foreign trips and programming of computerized information systems; also the implementation in two or three regional information centers and the integration of the aforementioned subsystems within lower-level information center networks;

the expansion of the SEIF system concept in the sphere of financial operations for PKO units and banks and for enterprise finance-accounting operations;

the development and national application of the SIR system. This will simplify analyses of the flow of financial resources, it will be a tool for an up-to-date, objective view and evaluation of economic processes and phenomena, and it will accelerate the development of a modern bank transfer clearing system. Initially, banks and PKO offices in large urban centers--especially in Warsaw, Katowice and Wroclaw--will be automated, thereafter it will occur in Krakow and Gdansk. Units subordinate to the Information Science Association [ZI] will collaborate in the development and trial application of the SIR subsystem.

An analysis of the effectiveness of existing computerized information systems shows that best results are achieved when a central computerized information center is created for a ministry and when uniform program packets are imposed on most of the enterprises. Thus the model developed by the Ministry of Machine Engineering Industry--after adapting it to JS EMC machines--is also used by other industrial ministries, in addition to using their current output. Such a computerization model should be used by the Ministry of Heavy and Agricultural Machine Industry, the Ministry of Light Industry and others, but the Ministry of Mining, the Ministry of Metallurgy and the Ministry of Chemical Industry should develop already existing solutions.

The Ministry of Agriculture and the Ministry of Food Industry and Purchases are tasked to coordinate the programs and plans for the development of their ministerial systems so that they will encompass total management of food in the country.

Systematic computerization based on reproducible program packets will continue in the Ministry of Construction and Construction Materials Industry, the Ministry of Power Industry and Atomic Energy, the Ministry of Transportation and the Ministry of Science, Higher Education and Technology.

The Ministry of Administration, Local Economy and Environmental Protection will coordinate on a national scale work associated with adapting regional data banks of government and ministerial systems for the informational use of regional administrative organs.

The Ministry of Domestic Trade and Services and other ministries which require information computerization of management should initially support the development of information science applciations using the technical base of ZETO [Electronic Computer Computation Offices] regional centers.

MERA-ELWRO, the general supplier of computer hardware, is obligated to meet the needs of government and ministerial computerized information systems as well applications systems in with priorities set by the central coordinator, the Information Science Committee. The domestic computer industry should adjust the quantity and assortment of its produced hardware to the standard needs of units providing computerized information services, especially remote processing and multiaccess systems based on extended terminal networks.

Applying user program packets should be coordinated by interested ministries. The Ministry of Machine Engineering Industry is responsible for developing basic software for JS EMC hardware and the Minicomputer System. ZI's network of centers is the base for developing applications for information science in smaller enterprises and in units subordinate to a ministry which do not have their own computer base. Within the SINTO system framework, ZI will keep a current register of programs and computerized information systems, and expand research, development and consultation activity in the area of processing software.

Automation of Technical Work

Systems that automate engineering calculation include those that encompass structural design and the technology and organization of product production. These systems lend themselves to substantially shortening the design cycle and the initiation of production, and to elasticity in adapting the production process to the changing requirements of the market, and also to improving the quality of products and the reduction of their material and energy intensiveness.

The trends of computerization in this area are:

equipping construction design offices and design offices with appropriate computer equipment;

improving the information base of design offices by assuring them services by specialized information center of the SINTO system;

computerization of about 20 design offices based on computer equipment made in Poland or in other socialist countries, and, as required, on imported program packets and special peripheral equipment;

dissemination of current output in the area of computerization of design and structural work (for example, Construction Industry Electronic Computer Computation [ETOB]).

In purchasing computerized information software or hardware for design offices in the second payments area (western countries), priority should be given to units associated with expanding export activity.

In turn, Automation of Technical Control Processes [ASPT] should aim to decrease the material waste and energy intensiveness of those processes, to stabilize technological parameters, to adapt technological modes to the characteristics of the raw material, and to limit the need for labor.

The main areas of industry in the framework of which ASPT is expected to develop represent about 80 percent of the value of total domestic production, even though they represent only about 40 percent of all the industrial branches.

Selecting the priority areas has been decided primarily by the following criteria:

total value of annual production;

significance of production from the viewpoint of supplying the market and export activity;

the status of preparations for preparing the technological process for automation, especially the modernity of applied technology and the extent to which the basic algorithms for controlling a process have been mastered;

the existence of other instructions (for example, social and personnel) requiring the introduction or expansion of automation.

Technical Resources

It is assumed that in the 1981-1985 period the equipment base will be hardware manufactured in Poland or in multilateral collaboration with other socialist countries that will be coordinated by the International Commission for Electronic Computing Technology. In principle, it is expected that

hardware will not be imported from the Western countries except in special cases wherein such hardware could be used as a model in scientific research and development work.

MERA-ELWRO, the general supplier, is obligated to provide technical service for an existing system based on the ODRA 1305 and 1325 computers, spare parts and peripheral equipment which will permit the required operating capabilities to be achieved until these systems are fully depreciated.

In place of the removed computer and minicomputer equipment, new hardware will be introduced that will have better technical parameters and in quantities that will assure full coverage of any decline in calculation power. Means should also be developed to effectively transfer ODRA 1305 applied software for use on JS EMC computers (a MERA project).

Domestic production of R-32 type computer systems will be expanded. These systems will include operating memories of up to two megabytes and be equipped with various peripheral equipment and large disk memories on the order of 100 megabytes. Such systems should be available by 1983 at the latest. The R-45 system, however, will be coproduced with the Soviet Union. Most of the systems should be multiaccess systems capable of operating in the interactive mode via terminal equipment.

In the minicomputer equipment area, the production of MERA-400 and MERA-60 systems and specialization in the production of the SM-50 systems, which belong to the second series of JS EMC minicomputers, are anticipated. The production of special types of MERA-50 and MERA-7900 minicomputers will also increase.

Considering the domestic industry's current production capacity and trends of economic activity, which should be aided by computerized information systems, it is expected that in the 1981-1985 5-year period 550 computers and about 1,800 minicomputers will be produced.

The MERA Association will attempt to continuously expand and improve services performed by its computer service units for computer centers nationwide. In cooperation with ZI, it will also expand user program service.

One of the essential conditions for realizing the given tasks is the development of telecommunications computerized information systems and services. A decisive factor in this development is the level of telecommunications computerized information resources, that is, telecommunications and information science resources, including such equipment as subscriber stations, telecommunications processors and remote data concentrators.

The current status of the telecommunications network and the level of domestic production of data transmission equipment do not satisfy the growing needs in this area. Thus the tasks of the Ministry of Communications and the Ministry of Machine Engineering Industry, which are responsible for supplying the basic equipment for teleprocessing purposes, are all the more greater.

For the 1981-1985 period, the priority tasks in the realm of data transmission and telecommunications computerized information systems are:

scientific research and design-application work on ministerial and crucial problems to be conducted by:

the Ministry of Communications, the Ministry of Machine Engineering Industry, the Ministry of Science, Higher Education and Technology and the Ministry of Finance as leading units in the realm of designing nationwide uniform systems;

units responsible for developing government computerized information systems and teleprocessing systems based on the domestic telecommunications network;

the Ministry of Transportation, the Ministry of Mining and other ministries in the area of applied solutions that are of a special economic and social range, based on a ministry's own communications resources.

Development work and production activity in the area of telecommunications computerized information and the technical base:

the creation of organizational and technical conditions for comprehensive use of the telegraph (telex and telegram) network within the framework of the PIAST [Telex Administrative Information Transmission System] and the BIST [Base Computerized Information Telex System] and based on the IT 300 programmed subscriber station;

the construction of multifunctional, interconnected regional data transmission networks (for the Warsaw, Katowice and Wroclaw voivodships) as a component of an integrated domestic telecommunications network;

the application of basic equipment for a separate mutliplexer network;

the installation of interactive subscriber stations based on mosaic-character printers and dependent and independent CRT monitors;

building low- and medium-speed AP-70 and AP-14 subscriber stations for remote batch processing;

the realization of an experimental computer network to service the higher schools, the SINTO government system and scientific research institutes in the Warsaw, Wroclaw and Katowice regions;

the introduction of an automatic seat reservation system for PKP and PKS passenger traffic;

the application of the PLON system based on the PIAST system.

The measurable effects of using computerized information methods in management are expressed when sums significantly exceed outlays, even with prudent estimates. Also, unmeasurable and derivative effects are additional justifications for the advisability of implementing information science as an important factor in improving the functioning of the national economy.

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PHARMACEUTICAL CATALOG LISTS PRODUCTS FOR EXPORT

Bucharest REVISTA ECONOMICA in Romanian No 26, 27 June 80 p 14

[Article by Prof Dr Simion Purice]

[Text] Romania, now among the first 10 countries in the world for the development of the chemical industry, has created a powerful chemical sector of small-scale production, a field in which pharmaceutical drugs play an important role. Romania now turns out more than 1100 conditioned drugs, which actually cover all the therapeutical groups known in the world. The pharmaceutical enterprises, located in centers with a rich medical tradition in terms of college education and research (Bucharest, Iasi, Cluj-Napoca) turn out products which largely meet domestic needs and also are exported to many foreign countries.

In order to respond to the growing interest displayed by many foreign firms for getting to know the full export catalog of our country, the specialized industrial central recently issued a book in English "Romanian Drugs," which contains the current achievements of the national pharmaceutical industry.

A characteristic of the last decades in human pathology involved an intensive research effort for identifying the causes of the appearance of some diseases and the elucidation of the causative mechanisms. These new discoveries were made possible thanks to the tremendous progress of the scientific basis and the new techniques used in research and definition of diseases. The headway in domestic science and technology and the advances based on cooperation with foreign pharmaceutical firms of international reputation resulted in the development of very many new drugs which meet the strictest world standards and have a high curative effectiveness. The fact that the specialized industry closely cooperates with medical research and practice lends seriousness both in selection for production of the products which are really necessary for the treatment of specific ailments and in development of the production process. Besides turning out products that are part of the therapeutical range on a world scale, our unique pharmacopoeia was enriched by materializing, in the form of highly therapeutically effective drugs, a number of domestic investigations, which originated in a scientific experiment or an empirical basis of observation.

Such products which were internationally appraised include: Aslavital, Gerovital, Boicil forte, Covalitin, Distonocalm, ETO, Folcisteina U, Trofopar, Ulcosilvanil, and so forth.

Romania now produces drugs which cover every pathological aspect. These drugs are products with greatest effectiveness in the disease involved and meet the strictest world standards.

The drugs needed for treating maladies which are widely spread in our days, such as those of the cardiovascular system involve basic products in treatment such as digitalis drugs (digitaline, digoxin and injectible products -- deslanoside, lanatoside C and strophanthin), antiarrhythmic drugs (propanolol and xylene) and antianginal drugs (nitroglycerin and nitroglycerin R, dipyramidanol, agazol and carbocremene). The antihypertensive drugs include, in addition to propanolol, hypopresol and hypazin, hyposerpil (with its injectable form for emergencies: raunervil), grimerdin, guanetidin, and so on. The antianemic substances are amply represented by: glubifer, polymaltase iron, folic acid, Vitamin B-12, hemostatics -- aminocaproic acid, fitomenadian, Vitamin K-3, hemostat, adrenastastazin, and anticoagulants -- heparin and thrombostop. The drugs for the digestive system involve a number of new, highly-effective, outstanding products: antiacids (calmogastrin, dicarbocalm, tristilicalm, ulcerotrat, ulcomplex), Ulcosilvanil, coleretics (anghirol, carbicol, colebil, fiobilin), antispastics (scobutil, papaverin, foladon, atropine, lizadon, distonocalm), and antiemetics (emetiral, metocloramid, torecan) or laxatives (galcorin, cortelax, and so forth). Drugs for the treatment of the respiratory system include anticoughing substances (codenal, tusan, tusomag), expectorants and bronchodilatators (miofilin and astmofug). The anabolic medication is very diversified (decanofort, norbetalon, clafibrat, clofenat, Vitamin PP, soiodin, arginim sorbitol, multiglutin probencid, Covalitin 1, 2, and 3). Romanian pharmaceutical catalog lists provide various preparations for electrolytic restoration, very diverse analgesics (acetylsalicylic acid, salicylamid, phenylbutazone, indometacyn, aminophenazone, paracetamol, codamine, fasconal, antinevralgic, antimigrin, and so on) or the unique products Boicil, Pell-Amar, Pelox, and so forth.

Particularly valued at home and abroad are the antibiotics (various types of penicillin, cloxacillin, meti and oxacillin, ampi and carbenicillin, erythromycin, tuberculostatics, nagamycin, tetracyclin, chloramphenicol, polymixins, antimycotics), various kinds of sulfamides, and drugs with tissular trophic effects such as: Aslavital, folcystein, Gerovital H-3, Hemineran; hepatotropics: mecopar forte, multiglutin and metaspar. Moreover, equipment and substances for perfusion, plasma substitutes, various injectable substances and materials for surgical suture were produced.

This wide range of drugs provide the physician with almost everything he needs for current medical practice.

The intiative in preparing a systematic catalog which also offers users in other countries this wide range of quality products is commendable. The scientific accuracy of the classification and the outstanding layout put the

book on an equal level with the current requirements of the world specialized market.

The book is part of an ampler promotion program, which, according to our information, involves preparation of detailed monographs of unique Romanian drugs. The monographs will contain, in addition to the characteristics included in the catalog, also a description of the successive stages which led to the discovery and production of the new drugs, the results of the clinical tests -- in some cases over long periods of time -- which proved the therapeutical effectiveness of the new Romanian drugs.

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